REMARKS

By this amendment, claims 2-4 have been canceled, claim 1 has been amended and new claims 28-30 have been added. Currently, claims 1 and 5-30 are pending in the application with claims 5-27 being currently withdrawn from consideration.

Claim 4 was objected to because the Examiner believed that the phrase "a plurality of said rectifying nets are provided and placed in the upstream side and the downstream side of the fluid flowing within said duct for said rectifying grid" is unclear and confusing. By this amendment, claim 4 has been canceled and this objection is now moot. Applicants have revised this feature and presented it in the last two paragraphs of amended claim 1. Therefore, applicants respectfully submit that this objection should be withdrawn.

Claims 1-3 were rejected under 35 U.S.C. 102(b) as being anticipated by Christenson (U.S. Patent No. 5,606,622). The Examiner believed that Christenson disclosed an active noise cancellation system in a duct 18 comprising input microphone(s) 12, error microphone(s) 14, control speaker(s) 16, an active noise system controller 10, and a turbulent airflow control device 20.

This rejection is respectfully traversed in view of the amendments to the claims and the following remarks.

The present invention relates to an active noise control system for reducing noise generated in a duct for a fluid.

As shown in Fig. 7, a duct 30 is a duct for conveying a fluid A to the outside of the system. A noise B is propagated together with the fluid A in a direction Z from the upstream portion of the duct 30.

A noise detection microphone 35 is attached, as a noise detector, at a location upstream in the duct 30. In addition, a control sound source 37 is attached downstream of the duct 30 and an error detection microphone 36 is attached in the vicinity thereof as an error detector. Then, an arithmetic circuit 38 is provided so as to generate a control signal based on a reference signal from the noise detection microphone 35 and a residual signal from the error detection microphone 36.

The arithmetic circuit 38 generates a control signal by using an active noise control algorithm so that the residual signal becomes small at the error detection microphone 36. The control sound source 37 is a speaker that converts the control signal of the arithmetic circuit 38 into a control sound and that radiates the control sound downstream in the duct 30.

Several kinds of rectifying members, such as a rectifying grid 32, a first rectifying net 33 and a second rectifying net 34 are attached upstream in this duct 30 to serve as a rectifying part 31. The rectifying grid 32 has a number of small holes or capillaries having a form of a honeycomb shape, a circular shape or a rectangular shape in cross section and they are provided in the axial direction of the duct 30 (Z axis direction). The rectifying grid 32 has a function of adjusting the velocity vector of the fluid in the direction of the Z axis. In the present embodiment, a honeycomb material, of which the cell size is 3/16 inches, the opening ratio is 96% and the grid length is 100 mm, is used as an example of the rectifying grid.

The first rectifying net 33 and the second rectifying net 34 are nets having a predetermined opening ratio. For example, nets having a wire diameter of 0.508 mm, the number of interstices of 10/inch and the opening ratio of 64% are used in the present embodiment. The rectifying nets have a function of making the velocity of the fluid A uniform in a perpendicular plane of the duct 30 by causing a pressure loss in the fluid A. Nets of the same opening ratio may be utilized for the first rectifying net 33 and for the second rectifying net 34, or nets of differing

opening ratios may be utilized. The smaller the opening ratio is, the greater the pressure loss in the fluid becomes.

Independent claim 1 has been amended to recite "wherein said rectifying part includes: at least one first rectifying net; a rectifying grid having an opening ratio greater than that of said first rectifying net, and said rectifying grid placed in said duct downstream of and spaced from said first rectifying net; and at least one second rectifying net having an opening ratio smaller than that of said rectifying grid, and said second rectifying net placed in said duct downstream of and spaced from said rectifying grid."

These features are not shown or suggested by Christenson.

Christenson relates to a system for providing active noise control for turbulent airflow in a duct utilizing flow straightening upstream of bullet shaped microphones coupled to the noise control electronics thereby improving noise coherence between the input and error microphones and achieving noise reduction.

As shown in FIG. 1 of Christenson, an active noise system controller 10 is coupled to input microphone(s) 12, error microphone(s) 14 and control speaker(s) 16 disposed in duct 18. The active noise controller 10 generates an anti noise acoustic field utilizing control speaker(s) 16 which cancels the noise

acoustic field and results in a quiet space. The active noise controller 10 is responsive to inputs from two sensing microphone(s) viz, input microphone(s) 12 and error microphone(s) 14.

Turbulent airflow control device 20 removes large structured turbulence moving parallel to the duct 18 sidewalls and/or the swirling of air in the duct 18 tangential to the duct 18 sidewalls. The turbulent airflow control device 20 can comprise a perforated plate 22, a honeycomb section 24, a screen 28, or a combination thereof. The perforated plate 22 breaks up turbulence moving down the duct 18 and weak swirls that exists in the duct 18. The honeycomb section 24 removes both weak and strong swirls.

Christenson also discloses that the perforated plate 22 (FIG. 2) may be installed upstream of the input microphone 12. Christenson also discloses that the honeycomb section 24 (FIGS. 3 and 4) may be attached to perforated plate 22. Also, Christenson discloses that the honeycomb section 24 alone may be installed and that the honeycomb only configuration is the preferred configuration due to its low pressure drop.

Applicants respectfully submit that Christenson does not disclose the features of claim 1 including "wherein said rectifying part includes: at least one first rectifying net; a

rectifying grid having an opening ratio greater than that of said first rectifying net, and said rectifying grid placed in said duct downstream of and spaced from said first rectifying net; and at least one second rectifying net having an opening ratio smaller than that of said rectifying grid, and said second rectifying net placed in said duct downstream of and spaced from said rectifying grid."

Christenson discloses that a honeycomb section 24 may be attached to the perforated plate 22 (see column 3, lines 36-38). However, Christenson does not disclose a combination of a first rectifying net, a rectifying grid and a second rectifying net in this order and having spaces between each of them. Also, Christenson does not disclose that the rectifying grid has an opening ratio greater than the first rectifying net and the second rectifying net has an opening ratio smaller than the rectifying grid.

For these reasons, it is believed that Christenson does not teach or suggest the claimed features of the present invention. Therefore, it is respectfully submitted that claims 1 and 28-30 are allowable over Christenson.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is now in condition for allowance and an action to this effect is respectfully requested.

If there are any questions or concerns regarding the amendments or these remarks, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Respectfully submitted,

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Randolph A. Smith
Reg. No. 32,548

SMITH PATENT OFFICE
1901 Pennsylvania Ave., N.W.
Suite 901
Washington, DC 20006-3433
Telephone: 202/530-5900
Facsimile: 202/530-5902
Kakuhari020706